Claims

1. The invention relates to a connecting element for mechanically connecting constructive elements (2, 3), comprising an elastically deformable tensioning element which applies a holding force in its elastically deformed state, onto at least one connected constructive element (2), thus generating a nonpositive connection of at least one constructive element (2) with the tensioning element or with another constructive element (3),

characterized in that

the tensioning element comprises a spring material consisting of a superelastic shape memory alloy, in particular a nickel-titanium alloy, elastically expanded in the tensioning element.

2. Connecting element according to claim 1, **characterized in that** the holding force is generated by bending forces and/or shear forces originated by the tensioning element during the elastic expansion of the tensioning element.

3. Connecting element according to claim 1 or 2, **characterized in that** the tensioning element is converted, during assembly, from the austenitic state to the

tension-induced martensitic state, by elastic tensioning or expanding, respectively.

4. Connecting element according to one of the claims 1 to 3, **characterized in that** the holding force is a contact pressure generated by the elastic expansion of the tensioning element, applied to at least one connected constructive element, inserted into the tensioning element.

5. Connecting element according to one of claims 1 to 4, **characterized in that** the tensioning element comprises a helicoidal spring (1, 4, 7) which is inserted, in axial direction, into at least one constructive element (2) to be connected.

6. Connecting element according to claim 5, **characterized in that** the spring (1, 4, 7) is elastically deformed and pre-tensioned for inserting at least one constructive element (2), being partially relaxed for realizing the connection.

A

7. Connecting element according to claim 5, **characterized in that** the spring (1, 4, 7) is tensioned for generating the connection.

8. Connecting element according to claim 5 or 6, **characterized in that** the spring is a compression spring (1), which is compressed in axial direction for inserting at least one constructive element (2).

9. Connecting element according to claim 5 or 6, **characterized in that** the spring is a tension spring (4), which is stretched in axial direction for inserting at least one constructive element (2).

10. Connecting element according to claim 8 or 9, **characterized in that** during the insertion of at least one constructive element (2) the coil of the spring (1, 4) is turned open for increasing the diameter of the coil.

11. Connecting element according to one of claims 5 to 7, **characterized in that** the spring is a leg spring (7).

12. Connecting element according to claim 11, **characterized in that** the legs (8, 9) of the leg spring (7) are bent up during the insertion of at least one of the constructive elements (2) in order to increase the diameter of its windings and for pre-tensioning of the leg spring (7) against the direction of winding of the leg spring (7).

13. Connecting element according to claim 12, **characterized in that** the leg spring (7) is partially relaxed for generating the connection.

14. Connecting element according to claim 12, **characterized in that** the legs (8, 9) of the leg spring (7) are bent together in winding direction of the leg spring (7), exceeding the relaxed state, for a decrease of the diameter of its windings, to obtain the connection.

15. Connecting element according to claim 11, **characterized in that** the leg spring (7) is relaxed during the insertion of at least one of the constructive elements (2) to be connected, and that the legs (8, 9) of the leg spring (7) are bent together in the winding direction of the leg spring (7) for a decrease of

the diameter of its windings and for generating a tension in the leg spring (7), to obtain the connection.

16. Connecting element according to one of the claims 5 to 15, **characterized in that** a constructive element (2) to be connected, is inserted in the spring (1, 4, 7).

17. Connecting element according to one of the claims 5 to 15, **characterized in that** at least two constructive elements (2, 3) to be connected, are inserted in the spring (1, 4, 7).

18. Connecting element according to claim 17, **characterized in that** at least two constructive elements (2, 3) contact each other with their face ends, or are oriented with their ends facing to each other.

19. Connecting element according to claim 18, **characterized in that** connected constructive elements (2, 3) are surrounded, in the range of their contact point, by a joint element, in particular a joint tube (5) or various joint shells, transferring the holding force of the spring (1, 4, 7) to the constructive elements (2, 3) to be connected.

20. Connecting element according to claim 17, **characterized in that** connected constructive elements (2, 3) within the spring (1, 4, 7) are arranged parallel to each other in a section (6).

21. Connecting element according to one of claims 1 to 4, **characterized in that** the tensioning element comprises a clamping sleeve (10), into which at least

one constructive element (2) to be connected, is inserted in axial direction, whereby the clamping sleeve (10) is elastically deformed and pre-tensioned by compression, for inserting the at least one constructive element (2), and is partially relaxed for realizing the connection.

22. Connecting element according to claim 21, **characterized in that** the clamping sleeve (10) shows a circular cross section in the relaxed state, and shows an oval cross section in the pre-tensioned and in the partially relaxed state.

23. Connecting element according to claim 21, **characterized in that** the clamping sleeve (10) shows an oval cross section in the relaxed state, and shows a deformed state as compared to the relaxed state, e.g. a circular or oval cross section, in the pre-tensioned state, and shows an oval cross section in the partially relaxed state.

24. Connecting element according to claim 21, **characterized in that** the clamping sleeve (10) shows an oval or circular cross section in the relaxed state, and shows a cross section deformed on three sides in radial direction in the pre-tensioned state, and shows a cross section arced on three sides in the partially relaxed state.

25. Connecting element according to one of the claims 21 to 24, **characterized in that** two or more constructive elements (2, 3) to be connected, are inserted in the clamping sleeve (10), being arranged parallel to each other within a section (6) of the clamping sleeve (10).

26. Connecting element according to one of the claims 21 to 25, **characterized in that** two or more constructive elements (2, 3) to be connected, are inserted in the clamping sleeve (10), which contact each other with their face ends in the clamping sleeve (10), or which are oriented with their ends facing to each other.

27. Connecting element according to claim 11 and one of the claims 21 to 26, **characterized in that** at least one of the legs (8, 9) of the leg spring (7) is inserted in the clamping sleeve (10).

28. Connecting element according to claim 27, **characterized in that** both legs (8, 9) of the leg spring (7) are inserted in the clamping sleeve (10).

29. Connecting element according to one of the claims 27 to 28, **characterized in that** another constructive element (3) to be connected, is inserted in the clamping sleeve, which is arranged, within the clamping sleeve (10), besides at least one leg (8) of the leg spring (7).

30. Connecting element according to one of the claims 1 to 29, **characterized in that** at least one constructive element to be connected is inserted in the tensioning element, and a section (6) engaged with the tensioning element, of at least one of the constructive elements (2) to be connected, is friction-increased.

Ins A7)